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The Effects of Cooperative Learning on the Math Performance in Students with Emotional Behavior Disorders?

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CERTIFICATE OF APPROVAL

This is to certify that the action Action Research Final Project of

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Abstract

The purpose of this study is to examine the effects of cooperative learning (CL) on the math performance of middle and high school students with Emotional Behavior Disabilities (EB/D). Two classes, for a total of 16 students, participated in the study. One class of eight students was used as the control group. The other class of nine students was placed in three groups of three cooperative learning teams. The study was conducted between September 1st, 2004 and March 20, 2005. This was the equivalent of three quarters of the school year with cooperative learning being used as the instructional strategy for the second quarter only. During the first and third quarters, material during mathematics was presented through lecture and independent reading. Students worked on class assignments individually.

The findings show that cooperative learning groups during second quarter improved the students math grades by 14% or by two full letter grades, going from C's to A's. Cooperative learning increased the student's Minnesota Basic Standards Test (MBST) in Mathematics scores by an average of 35 points. Student behavior was also effected by the cooperative learning groups. Negative behaviors in the classroom and in the school dropped 65% during 2nd quarter for those students who participated in the cooperative learning groups. The In School Suspensions (ISS) also decreased 70% when students participated in the cooperative learning groups. On a questionaire that the

students completed, the students indicated that they 1) enjoyed working in the cooperative learning groups, 2) they felt the cooperative learning groups helped them with their math, 3) they were motivated by the cooperative learning groups, and 4) they would like to participate in cooperative learning again.

This study showed that the major benefits of cooperative learning in the mathematics classroom were; increased participation, increased assignment completion, increase in overall quarter grades, increase in MBST scores, a decrease in negative behaviors in class and throughout the school day, a decrease in severe negative behaviors resulting in ISS, as well as positive teamwork skills developed and small group skills and social skills learned by most of the students.

Training Camp
Introduction and Origin of the Study

Most students aspire to graduate from high school and go on with the next phase of their lives. Students with disabilities, however, are often not able to realize that dream. Based on graduation statistics from 2001, only 59% of students with disabilities graduated from high school in the State of Minnesota (McMillan, 2003). The graduation rate drops even lower, to 48%, when you look at the specific disability EB/D (McMillan, 2003). Many students are required to pass state or federal tests as a requirement for their graduation, and most students with disabilities fail to pass these tests, as shown on results from students scores on the Minnesota Basic Standards Tests (McMillan, 2003). In Minnesota, only 63% of students with E/BD pass the Minnesota Basic Standards Writing Test, while only 49% pass the Minnesota Basic Standards Reading Test, and only a startling 32% pass the Minnesota Basic Standards Math Test (McMillan, 2003). The goal of educators is to leave *no child behind*, but when we look at children with disabilities and especially those with EB/D, we appear to be failing. The National Department of Education, State Departments of Education, and individual school districts are all searching for ways that they can raise the graduation rates of students with disabilities. For these children to succeed, and not be left behind, we need to find instructional strategies that will create an environment that fosters the greatest learning in all subject areas, but this is especially true in mathematics.

Cooperative learning is a learning strategy that is widely used in regular education classrooms today with great success (Kagan, 1994, O'Connor & Jenkins, 1996, Puma, Jones, Rock & Fernandez, 1993). The use of cooperative learning promotes higher achievement than competitive and individualistic learning strategies across all age levels, subject areas, and almost all tasks (Johnson, 1982, Antil, Jenkins, Wayne, & Vadasy, 1998). Cooperative learning can be defined as "the instructional use of small groups or partners so that students can work together to maximize there own and each other's learning" (Jenkins, Antil, Wayne, Vadasy, 2003, p. 279). Students work together to support each other, assume responsibility for both their own and others' learning, and employ group-related social skills (Johnson & Johnson, 1989). The advantage to using cooperative learning in the classroom is to promote academic achievement, increase positive peer interactions, and enhance pro-social attitudes and feelings. The use of cooperative learning with students in special education, in mainstream classrooms however, has received mixed results. In some studies, students with disabilities have not made achievements in their academics while participating in cooperative learning in mainstream classrooms. "The opportunity for all students to study together does not guarantee gains in academic achievement" (Tateyama-Sniezek, 1990, p. 436). "Teachers may wish to exercise caution in deciding whether to use cooperative learning to improve special education students academic performance" (McMaster & Fuchs, 2002, p. 116).

The aim of this research is to examine how cooperative learning effects math performance skills in special education students and specifically, those with E/BD in a self contained setting.

If educators truly are going to leave no child behind, we need to determine how we can help children with disabilities reach their full potential. Students in special

education have not responded, or have responded on a limited basis, to other teaching strategies, such as individual or competitive learning strategies, and are failing at an alarming rate (McMillan, 2003). For the success of educators, and for the success of all students, we need to determine the validity of learning strategies with all student populations. By examining if cooperative learning can be a valid learning strategy in mathematics with students in special education, and specifically students with E/BD, we will get closer to the ultimate goal of allowing each student to succeed to the best of their ability.

Educators are trying to determine the best practices and strategies so that they may lead all of America's youth forward to achieve their full potential. By finding successful strategies for special and regular education teachers who teach students in special education, we can determine new ways to lead these youth towards improved success in school and possibly in other aspects of their lives. This study will examine the use of cooperative learning in a self contained E/BD Special Education classroom as a learning strategy to teach middle school Mathematics.

Pre-season
Literature Review

There have been few studies related to the effects of cooperative learning on the Mathematics performance of students with E/BD in self-contained classrooms. The studies that have been done were in all-inclusive settings where just a small number of students with E/BD are in the class with a number of mainstreamed students (Jenkins, 2003, Johnson, 1982, Jenkins, 1998). Some of the studies group together all students with disabilities, which could include students with E/BD, but also could include students with Learning Disabilities (LD), Attention Deficit Disorder (ADD), and/or Attention Deficit Hyperactivity Disorder (ADHD). There were only a handful of studies done on the effects of cooperative learning on math performance, but those were all done in all-inclusive settings or were done with a similar learning strategy to cooperative learning called Peer Assisted Learning Strategies or PALS (Calhoon, 2003).

Jenkins (2003) reports on teachers' perceptions of how cooperative learning benefits special education students in regular mainstream education classrooms. The teachers were part of an earlier study (Jenkins, 1998) in which 85 teachers completed a survey on their use of cooperative learning practices in the classroom. In this study, 21 of the 85 general education teachers where interviewed about the use of cooperative learning in their classroom. Johnson & Johnson (1982) studied the effect of cooperative learning and individualistic strategies on the math achievement and task engagement of 31 eleventh grade students. Only three of these students were identified as having E/BD or LD and they worked in cooperative learning groups with mainstream students.

The Jenkins (2003) study showed that cooperative learning can come in many forms, but it is basically having the students working together in small groups on a given assignments. The students solve problems on their own and help each other learn the material. All the teachers used some form of cooperative learning in the study, but they did not indicate the exact procedures for their use of it in their classrooms. These teachers were selected based on having students with EB/D, LD and/or ADHD, as well as general education students in their classrooms. The teachers were from two urban and two suburban elementary schools. The results of the study show that teachers perceive that there are three major benefits to using cooperative learning with students with disabilities. Fifty-two percent of the teachers cited higher self-esteem, higher success rates and better products as those benefits.

Johnson & Johnson (1982) explain that individualistic training among these students was described as students working on their own and avoiding all interactions with other students. The cooperative learning was described as students working together in groups and completing one assignment as a group. They were praised and rewarded as a whole group. The students were assigned to the learning strategies randomly. The students received a test each week covering the present math material they learned that week, and at the end of the study, the total number of correct responses for each student who had taken all four tests was determined. The research reported a small impact on math achievement in the cooperative learning group, stating that, "both handicapped and non-handicapped students in the cooperative treatment tended to achieve at a somewhat higher level than did the handicapped and non-handicapped students in the individualistic treatment" (Johnson, 1982, p. 289). There were several limitations to this study. The sample size was small (31 students), and of those 31, only three were labeled as having a

disability. The three students labeled as having a disability are said to have E/BD or LD, but it did not state how many have each disability and/or if they have both disabilities.

Other studies (Jenkins, 2003, O'Melia, 1984) were done grouping all disabilities together under one classification and none were specific to students with E/BD. The Johnson & Johnson (1982) study grouped students with E/BD and LD together as students with disabilities, and the Jenkins (2003) study grouped students with EB/D, LD and/or ADHD into one group of student's with disabilities. O'Melia and Rosenberg (1984) studied the effectiveness of cooperative learning on the math achievement of 179 middle school students with disabilities in 20 different classrooms. The study consisted of only 11 students who were identified as having E/BD and they were in regular education settings.

Two studies were found that focused on the math performance of students. One study focused on Peer-Assisted Learning Strategies (PALS), which is similar to cooperative learning (Calhoon, 2003). With PALS, students are paired to work together a couple of times per week and only for 15 minutes or so per session. One student will work on some problems out loud with their partner, and the other students correct, monitor, and tutor them. The two then switch and repeat the process with roles reversed. Calhoon (2003) studied the effect of peer-assisted learning strategies (PALS) on mathematics performance on high school students with disabilities. Ten classes with 92 students in grades 9-12 participated. All of the students were in self-contained resource rooms and measured with two math achievement tests: The Math Operations Test-Revised and The Math Concepts and Applications Test. The results of the study show that the students with disabilities who used PALS outperformed the control group on the achievement tests in computational skills, but they did not show an increase in

concepts/application skills. The research also cites other studies (Fuchs, 1992) that show PALS to be effective in all math skills, contradicting what the Calhoon (2003) research tells us.

The other study that focused on math was the O'Melia and Rosenberg (1984) study. Students were given a mathematics assessment, and groups were formed using the results of those assessments ensuring that the groups were equal in their math ability. Groups met together and corrected each other's work and then helped those who had wrong answers. The groups were then rewarded based on their correct responses and homework completion. The dependent variables were the measured rate of assignment completion, the percentage of problems they got correct, and mathematics achievement as measured by the California Achievement Test (CAT). The results showed that there was a significant increase in homework completion and percentage correct with the cooperative learning groups, but there was no significant difference on the math achievement scores on the CAT between the control group and the experimental group.

In summary, the results are promising from these studies showing that cooperative learning may be effective in helping students with E/BD in their behavior and in their social skills. However, this literature review suggests that more research needs to be conducted in the effectiveness of cooperative learning on math achievement in students with E/BD. An important aspect in studies with students with E/BD should include direct observations of behaviors and peer interactions as well as on achievement scores and homework completion. More research is also needed on students with E/BD in self-contained settings and not in all-inclusive settings as the case in most regular education classrooms. By studying E/BD students' behaviors and social interaction, as well as their homework completion and accuracy, and achievement results on the Minnesota Basic

Standards Math Test, we may gain better insight into the effectiveness of cooperative learning and the achievement in mathematics for students with E/BD.

The Season
Methodology

In this research study, the effectiveness of the learning strategy, cooperative learning, on the math performance of students with E/BD was evaluated. The research was conducted using qualitative action research to determine cooperative learning's effectiveness (Mckay, 1992). Action research is a three-step spiral process of (1) planning which involves reconnaissance, (2) taking actions, and (3) fact-finding about the results of the action (Mckay, 1992). Action research is inquiry or research in the context of focused efforts to improve the quality of an organization and its performance and is the major method of grounded theory (Glaser, 1969). Grounded theory provides us with relevant predictions, explanations, interpretations, and applications and leads us to the discovery of theory through data (Glaser, 1969). It typically is designed and conducted by practitioners who analyze the data to improve their own practice. Action research can be done by individuals or by teams of colleagues (May, 1993).

Another definition of qualitative research can be offered by, Denzin and Lincoln (1994).

> Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in the terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials-case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts. Qualitative

researchers deploy a wide range of interconnected methods, hoping always to get a better fix on the subject matter at hand. (p.2)

The three forms of data collection used for this research project were observation, document review and personal interviews. Merriam (2001) and Yin (1994) both agree that these three forms of data collection are the general techniques used in data collection for action research or case study projects.

Students selected for the study were part of two different math classrooms in a segregated E/BD, federal setting IV, alternative day treatment center. There were a total of sixteen students in the two classrooms between grades 7-12. Only one student in this group has passed the Minnesota Basic Standards Math Test, and one student was taking the test for the first time. The MBST tests are given once a year and the remainder of the students were retaking the test, for the second or third time. The students took the test two months following the implementation of the cooperative learning groups. One class, consisting of seven students, was used as the control group. The other class of nine students participated in cooperative learning groups. Participation by the students in the study was voluntary; however, the study was based on an instructional strategy that was used in their math class regardless of their participation, so participating in the study was actually participating in their math class as they normally would. The students worked together in groups of three or four students on all of their math assignments and problems.

The first step of action that needed to be taken, according to Kagan (1994), in trying to incorporate cooperative learning in the classroom is the development of teams. The teams should be heterogeneous and balanced according to ability as best as possible (Kagan, 1994). To determine the students' performance level they were given a practice

MBST math test. The tests were scored, and based on the results, the class was divided into three teams per class. I wanted to place a student who did poorly on the practice test with a student who scored in the middle and a student who scored in the top three in the class on the test into each group. The three girls in the class also had to be divided. One girl was assigned to each group. By splitting the class into heterogeneous groups, and based on their abilities, I tried to ensure the groups were fair.

One challenge faced in assigning the groups was where to place one student who was also diagnosed with a learning disability in mathematics and whom the class did not particularly get along with. It was assumed that the students would react negatively if they were placed in a group with this student, and this scenario would effect how well the groups would work together for the rest of the study. I decided that a female student would be placed in the group with that particular student. Prior to the announcement of teams, I explained to her that when we split the math class up into teams, she was going to be teamed with James because she was seen as the most mature candidate to work with James. I also explained that she was such a great leader that the rest of their team would follow her lead and work well with this student. I asked her if she was up to taking on that responsibility, and she agreed she was. The class was then told their group assignments, and they got into their teams and worked on some basic math problems.

The second key concept in cooperative learning according to Kagan (1994) is the concept of cooperative management. I decided that the groups would be updated on their progress at the start of every class period. The update included whether they had any assignments that were not finished or that were not handed in yet before the start of class everyday. This way the students were held accountable, and so were the teams. This served as a constant reminder of the importance of turning in assignments on time.

The third key concept in cooperative learning according to Kagan (1994) is teaching the will to cooperate. Team building, community building, and the skills involved in it needed to be addressed. Tom Jackson's "Activities that Teach" (1993) was used heavily in helping the students build the skills needed to work as a team. One day a week we would do these team-building activities to instill the importance of teamwork. For example, we did an activity called Knights of the Round Table, where students had to work as a team to move all members across a moat by means of going underneath an obstacle (table). Only one person could be on top of the table. The rest of the team has to pass underneath the table without touching the moat. If they touch the moat the whole team must start at the beginning again (Jackson, 1993).

The final step in setting up the cooperative learning environment was to come up with an idea to track the team's progress, keep the teams motivated, and provide an interactive measuring tool. Football season was in full swing, and it seemed like a natural tool that could be used to measure the team's homework completion rate and improvement points. Two large football fields were made on 4 foot by 4 foot pieces of green tag board (Appendix A). One field was made for each class. The lines and the yard numbers on the field were painted in white. Each team decided what NFL football team they would like to represent. Each class was split up into the two NFL Conferences. One class represented the AFC (American Football Conference) and the other class represented the NFC (National Football Conference). The groups chose their teams from their respected conference and were given a miniature helmet representing that team. Small strips of velcro were placed in a row on the football field from one end zone to the other with one strip on each ten-yard increment. Velcro was also placed on each helmet

so they could hang up on the field giving it a 3D effect. The idea was for each team to make it down the field and score a touchdown.

Once teams were in their cooperative learning groups, we spent two days talking about teamwork before I began giving them math instruction. We started out doing a couple of team building activities in class to show the importance that every member of a team has a role and if they did not do their job or fully participate, their team would not be successful (Jackson, 1993). We also spent time looking at the dynamics of teamwork and roles that each participant will play within their small groups (Kagan, 1994).

The groups all received math instruction as a class by me, or I taught each group with the assistance of one paraprofessional in the classroom. These groups worked together within their teams on their math assignments, helping each other with questions or problems. I only helped the students if no one in the group could solve the problems and/or the group needed additional instruction. The students were rewarded as a group for homework completion, homework and quiz accuracy, and homework and quiz improvements. The groups were rewarded using such things as praise, free homework passes, free computer time and extended recess.

Team performance and team progress was measured on two-point sheets (Appendix B and C), which tracked the student's homework, quizzes and trivia points earned for the week. They were awarded points for the entire team having all of their math homework turned in on time. If the team had all of their work in, they received five points for that particular week. They also could receive points based on their improvement from assignments in the previous week, which were also measured on the point sheet. Each student could receive between one and three points based on the

percentage increase on their scores on the assignments. The percentage breakdown and the points awarded are as follows:

1-4% increase = 1 point

5-9% increase = 2 points

10% and over increase = 3 points

The students started with a base percentage score based on the MBST math pretest they took, and that percentage was adjusted weekly based on the scores of their weekly assignments and quizzes. The improvement points were a way to motivate all students to try their best on each assignment no matter where their abilities in mathematics were. Students who had a harder time with math had an equal, if not a better opportunity, than the other students to earn points. This gave each student a sense of belonging and encouraged a sense of contributing to the team's goal. It also helped motivate them to learn the material.

Students were also awarded points on the weekly quizzes they took. If a student received a score of 90% or better on the test, they received between one and three points towards their team's total. The following is a list of the quiz point's breakdown:

90-93% = 1 point

94-96% = 2 points

97-100% = 3 points

The students points were calculated weekly and then they were offered NFL football trivia questions regarding their specific teams every Tuesday. One week the question might be "Who is your teams starting quarterback?" Or a question may be from Sunday or Monday's games, such as, "Who scored three touchdowns for your team last night?" These trivia questions were a good way to promote other subject areas and skills

as well. For example, students read the newspaper, watched the news, did research on the internet regarding their teams, and watched the games, to find information on their teams, so they could answer the trivia questions.

Once the assignments were graded, each team used that information to determine and calculate their final point totals for the week. This gave them some additional math practice in figuring out percentages, basic math practice and it kept them invested in the cooperative learning teams. Once each team calculated the point total, they reported their score to the class, and they moved their football helmet on the football field the correct yardage. Every twenty-five points earned was translated into 10 yards. Every ten yards earned the teams the following incentives:

10 yards = Gatorade during Math

20 yards = Free homework pass

30 yards = Bagel day

40 yards = Game day

50 yards = Free day

60 yards = Root beer floats

70 yards = Krispy Crème day

80 yards = Movie day

90 yards = Extra half hour of recess

Touchdown = Pizza party

The students were observed on a daily basis in the classroom as they worked in their cooperative learning groups for one quarter of the school year, which is nine weeks long. The observations looked at the groups themselves and how the students functioned in those groups. Cooperation, peer interaction, and social skills were looked at in these

cooperative learning groups. An observation journal was kept to log all participant observations (May, 1993).

The students were also interviewed on their perceptions of the effectiveness of cooperative learning. Taylor (1984) describes interviewing in a qualitative research project as the favorite "digging tool" of sociologists and that we rely largely on the verbal accounts to learn about social life. Another definition offered by Taylor (1984) states:

> By in depth qualitative interviewing we mean repeated face to face encounters between the researcher and informants directed toward understanding informants perspectives on their lives, their experiences, or situations as expressed in their own words (p. 77).

Interviewing is not only obtaining the answers in qualitative research but it is learning what questions to ask and how to ask them (Taylor, 1984).

At the conclusion of the study the students were asked the following questions:

- How did you think these groups affected or impacted your performance on the MBST math test?
- Explain your thoughts on working in groups and how it made you feel while you were working in them?
- How did you like working in your cooperative learning groups and why do you feel that way?
- Would you like to work in cooperative learning groups again in the future? Why?

The students who have yet to pass the Minnesota Basic Standards Math Test retook the test in February to measure their math achievement. Scores from the previous year's tests were then compared to this year's tests after the students had been involved with cooperative learning for three months.

The analysis for this action research project took place during the entire study. Merriam (2001) explains that in action research the data collecting and the data research happen at the same time.

> Data collection and analysis is a simultaneous activity in qualitative research. Analysis begins with the first interview, the first observation, the first document read. Emerging insights, hunches, and tentative hypotheses direct the next phase of the data collection, which in turn leads to the refinement or reformulation of questions, and so. It is an interactive process throughout that allows the investigator to produce believable and trustworthy findings. Unlike experimental designs in which validity and reliability are accounted for before the investigation, rigor in qualitative research derives from the researcher's presence, the nature of the interaction between the researcher and participants, the triangulation of the data, the interpretation of perceptions, and rich, thick, description. (p. 151)

Throughout the length of the study the researcher analyzed the data, which included the observations, the interviews, homework completion rates, grades from three quarters of the school year, and scores from previous years on the Math MBST as compared to this year's MBST scores. From this data that was collected, new questions evolved about the effects on the student's behaviors. New data was then collected using school behavior logs and In School Suspension (ISS) logs to determine the correlation between cooperative learning and math performance in students with E/BD as well as the correlation between the use of cooperative learning and student behavior in the classroom.

Playoffs
Findings

The study on the Effects of Cooperative Learning on the Math Performance in Students with Emotional Behavior Disorders has shown that cooperative learning can be beneficial to students with E/BD not only in math performance, but also in other aspects of school and potentially in their lives. Cooperative learning was shown to have positive effects on the student's grades and homework completion rates in math, in their increased scores on the Minnesota Basic Standards Math test, in their increase in positive behaviors displayed in school, and in their social skill development. I collected this data over a period of seven months or three quarters of the 2005-2006 school year.

Wild Card Playoff Game

The students who participated in the cooperative learning groups had a increase in their mathematics grades by a full two letter grades from 1st quarter to 2nd quarter when cooperative learning was used. The grades then fell back down two letter grades during 3rd quarter when cooperative learning was again not used. The students in the cooperative learning group earned an average of 66%, or a D for grades during 1st quarter when cooperative learning was not used as compared to the control group who earned an average of 63%, or a D, during 1st quarter. During 2nd quarter the cooperative learning group increased their grade by 14% to 80%, or a B, while participating in cooperative learning during Math class. The control group's grades decreased by 5% to 58%, or an F during 2nd quarter. Third quarter showed a decrease in scores to 65%, or a D, in group one when cooperative learning was again not used. The control group continued to show

a drop in their grades, dropping another 5%, or to an F, while again not participating in the cooperative learning. (Figures 1 and 2)

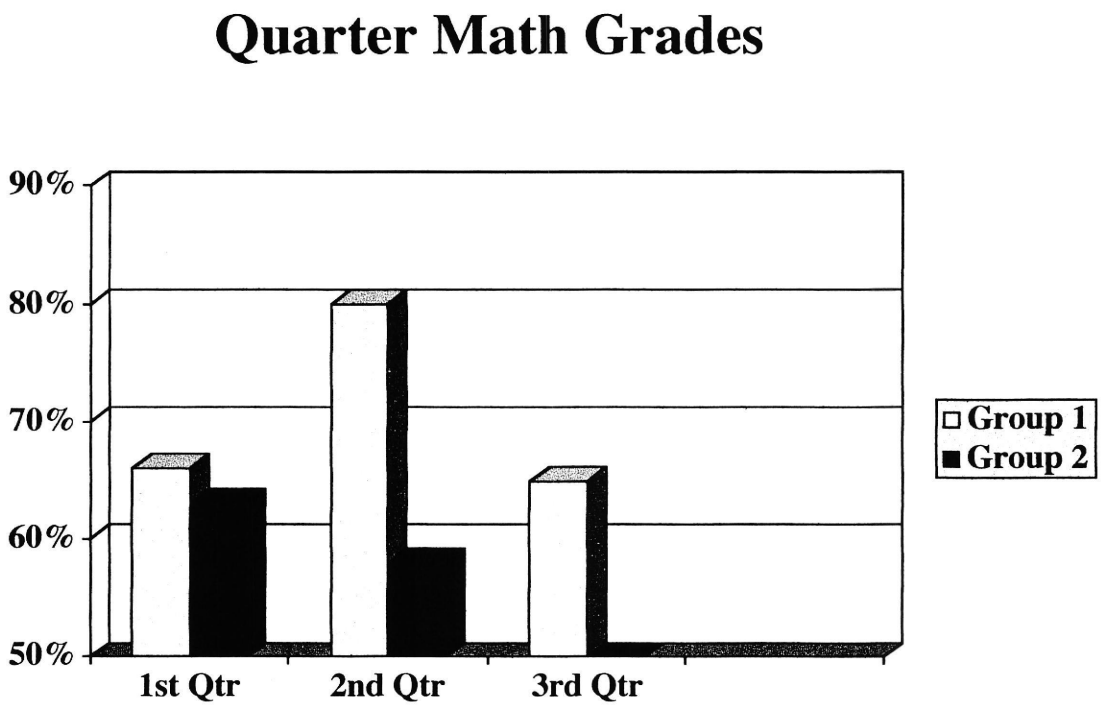


Figure 1. The math grades of students for each of the first three quarters of the 2004-2005 school year. Group 1 participated in Cooperative Learning during 2nd quarter only. Group 2 did not participate in Cooperative Learning.

The results of these findings are very positive. Group one showed a significant improvement in their grades in math class while participating in cooperative learning groups. Improving two full letter grades is a significant increase. In turn, by the students dropping back down two full letter grades to the class averaging D's for math show that, with all other factors being the same, cooperative learning had a large impact on the students math studies, their math homework completion and on their attitudes towards mathematics. One student said, "I didn't know that getting a B could be so fun. I might try again and do my assignments if learning is going to be this fun." Another student

added, "I actually learned something in math. I thought I would never learn anything and never be able to pass that stupid test. I actually think I will try on it this year." Students in general felt that cooperative learning made math more enjoyable and that they learned more by participating in their cooperative learning groups.

Comparing group one with group two, who showed no increase in their average grades and actually showed a drop in their grades by not participating in the study, shows that cooperative learning was a large factor in the success of group one. Both classes studied the same lessons and used the same materials. The only difference in the two groups was the use of cooperative learning groups with group one. Given its use and all other factors being equal, the study suggests that cooperative learning might be an effective tool to increase math performance of students with E/BD.

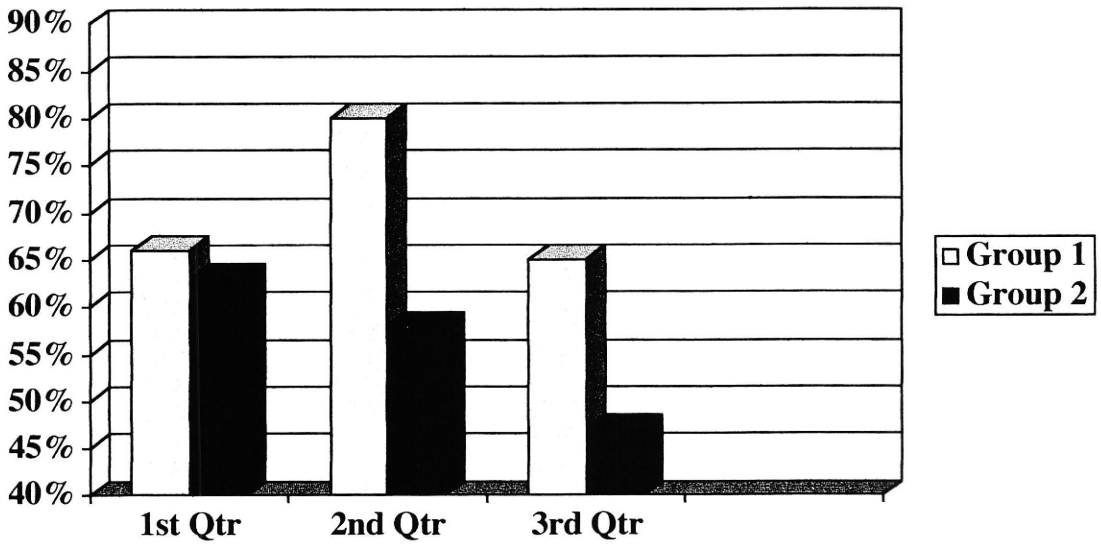


Figure 2. The percentage of the student's grades through the first three quarters. Cooperative Learning was used with group 1 during second quarter only.

It should be noted that two students who participated in the cooperative learning during Math showed a decrease in their grades. They had 63%, or D's, 1st quarter and dropped down to F's at 58% while participating in the cooperative learning. They continued to drop to 47% during 3rd quarter. Attendance was the main issue with these two students, and because of their absences, they never seemed to embrace the cooperative learning process. One of those students has since dropped out of school.

Divisional Playoff Game
Findings on MBST Math scores

The students in the cooperative learning group not only experienced an increase in their grades, but they also experienced gains in their scores on the MBST in Mathematics. The cooperative learning group averaged an increase of 35 points on the test compared to their results from last year's test. One of those students passed the test with a score of

647. A 600 is needed to pass the test. Only one student in the cooperative learning group had their score decrease. That score went down by 16 points from the test they took the previous year. Another student took the test for the third time and showed a significant increase in their score over the previous two tests. That student received scores of 545 and 546 on their two previous tests, showing little increase in the results after the first two attempts. On this third attempt, the student scored a 576, increasing their score by 30 points. He said, "Studying with my fellow Eagles made me learn the stuff more and it made me actually do the work. By doing the stuff, I actually learned something this year."

One of the girls that became a leader of her group also greatly benefited from the cooperative learning groups. She increased her score on the MBST in Mathematics by 64 points. She said, "Even though I didn't pass the test this year it makes me excited and gives me an attitude that says I can pass it next year."

Group two averaged a decrease in their scores, but this was greatly affected by the fact that three of the students walked out of the test after starting it, giving them very low scores because they did not complete the test. The control group averaged an increase of nine points on the MBST tests if you exclude the three scores from those that walked out. Group two is a group of older students with some of these students taking the test for the 3rd or 4th time.

Divisional Playoff Game
Findings on Behavior

Cooperative learning also proved to be effective in the behavior of the students. The cooperative learning group showed a significant increase in their positive behaviors at school. Negative behaviors were monitored and recorded by the staff at the school and include behaviors such as being off task, swearing, talking back, keeping hands and feet to self, being in their desks, etc. The behaviors were analyzed each quarter by looking at the behavior logs kept by staff and then compared with the results from the control group's behavior logs. Negative behaviors were calculated and recorded as a total number of negative behaviors, per day, per group.

During 1st quarter when Cooperative Learning was not used in either group, both the control group and the Cooperative Learning group had similar results with their negative behaviors. The control group averaged 10.75 negative behaviors per day, while the cooperative learning group averaged 11 negative behaviors per day. During 2nd quarter when cooperative learning was used, the control group's negative behaviors remained relatively unchanged, averaging 9.75 negative behaviors per day, while the cooperative learning group decreased their negative behaviors by 65% to less than five negative behaviors per day. Third quarter, cooperative learning was again not used with either group, resulting in an increase of negative behaviors by 50% or a total of 10 negative behaviors per day in the cooperative learning group. The control group again stayed consistent with nine negative behaviors per day (Figure 3).

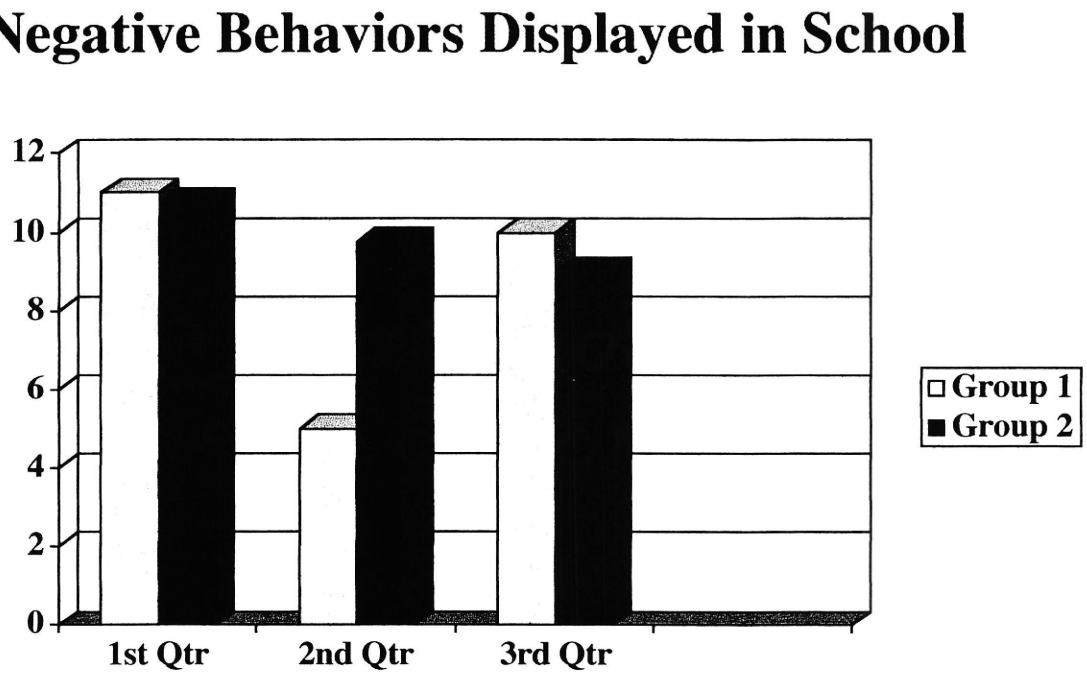


Figure 3. Negative behaviors documented by school staff for the first three quarters of the 2004-2005 school year. Group 1 participated in cooperative learning during second quarter only.

Negative behaviors that were more severe were consequenced with an ISS, which were also measured by the school,s staff and recorded on ISS forms. Examples of more extreme behaviors would include, swearing at staff, calling another student names, fighting, off task all hour, etc. These forms were calculated and averaged to how many ISS's were given to each group per day.

Again both groups were very similar in ISS's during 1st quarter when cooperative learning was not used, with group two averaging one ISS per day, and the cooperative learning group averaging 1.2 ISS's per day. Second quarter saw a big change in the cooperative learning group. They decreased their number of ISS's almost 70% down to .4 ISS's per day. The control group remained virtually unchanged averaging 1.1 ISS per day. During 3rd quarter, again when cooperative learning was not used, the control group

increased their ISS's almost 50% up to 2.3 ISS's per day. The cooperative learning group also increased their ISS's almost 75% up to 1.3 ISS's per day (Figure 4).

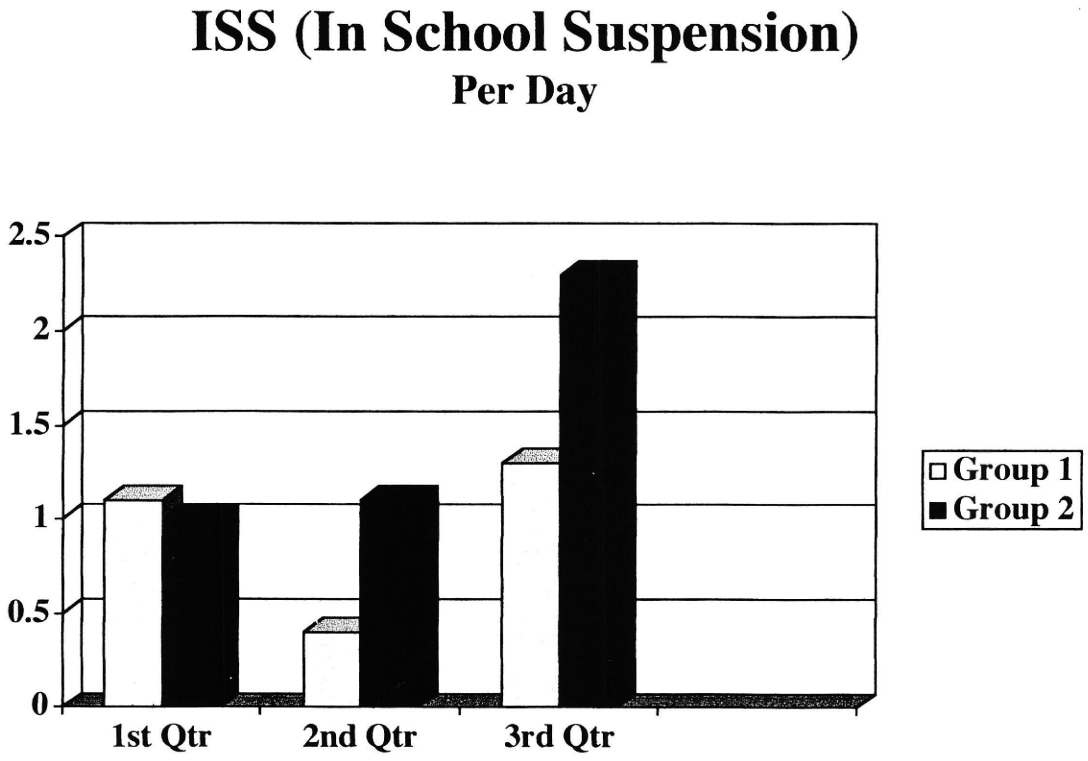


Figure 4. Suspensions documented by school records for the first three quarters of the 2004-2005 school year. Group 1 participated in cooperative learning during second quarter only.

Divisional Championship Game
Findings from Observations and Interviews

Participant observations and interviews with the students were a main method of data collection in the study of the effects of cooperative learning on students with E/BD. Through these observations and interviews, I gained another perspective on the effectiveness of cooperative learning.

Observing the students interacting within their cooperative learning groups showed some interesting results. The groups worked very well together for the most part. At first, there seemed to be some reluctance on the part of a few members, but once the groups got going, they all seemed to mesh fairly well. One group got into an argument over how they were going to go about doing the assignment. Members of this group were Alice, the leader, Trent, and Jesse (a student with a learning disability in math).

Trent said, "I am going to go on ahead of you guys, because I don't want to wait around for you two. You two are just too damn slow." Alice responded, "Fine, go on ahead, we don't want your help because you will probably do it all wrong anyway." After two days Trent started working with the rest of the group and actually asked them for help.

Leaders emerged almost immediately in each of the three groups. One of the three girls in the class was placed in each one of the groups. I believe they emerged as the leaders for a number of reasons. These three girls were the best students in the class, and they all did better in math class (before the cooperative learning groups) than the other students. Two of the girls were earning A's for math class and the other was earning a high B. Together, they scored the three highest scores on the MBST practice test. The three girls also had less behavior problems, in school, than the other students

meaning they were out of class less often and therefore understood the material better because they were not falling behind.

The students worked very well together in their groups. The students usually had to be asked to get to work a few times before they settled down and began working on their assignments. They would continue to chat about other things for a few minutes. When they first got together, they talked about their weekends, the night before, the newest video or some topic unrelated to math. I let them socialize for a few minutes before getting them back on task. During the group interaction, the girls all took over with their groups. One leader started their group out by asking, "So who understood the material on fractions today? " If someone did not understand the lesson, she or another member of the group would try and explain it to them. The same leader asked, "So now what part of the lesson do you not understand or are struggling with?" They worked together on the problems, while trying to stay at the same pace, making sure the other members were understanding the assignment.

The leader of one group did very well facilitating the group with no help or coaching, and the student that struggled with Math did better on his assignments than he did first quarter. The student that had the hardest time in the group was the student in the middle of the group hierarchy. He knew the material fairly well and would get very frustrated with the fact that the lower student could not get some of the concepts, and on a number of occasions he lost control because he did not understand something. He wanted to move on by saying, " Let's hurry up!", but the leader was waiting, so everyone could move on together. On two occasions Trent lost control. Once, he just finally stood up and screamed, "*What, are you f*@#* stupid?*" and walked out of the room.

The other time Trent got frustrated with Jesse he asked him, "*Do you get it now?*" and the response was, "*No.*" Finally Trent got frustrated and yelled, "*How the f*@$* do you not understand this, it is so F*&@* easy!*"

When these incidences occurred, Alice smoothed over the situation and got Jesse to stay on task and continuing to work by telling him to, "Just ignore him, he is just being an idiot." She just pretended it did not even happen, shook her head in disgust and continued working with Jesse one on one.

There was one occasion when Jesse got so frustrated with the assignment that he got up, threw his book on the floor, and walked out of the room saying, "*I can't do this, I'm too stupid.*"

Divisional Championship Game
Findings from Observations and Interviews

Interviews were also used to determine the effectiveness of cooperative learning in math class. One student wrote:

> *I liked the cooperative learning football game because it gave me a chance to meet and work with people whom I didn't really know before and who I didn't really like before. It made me get to know those people and encouraged us to work together as a team. The football game helped encourage us to get our assignments done on time, and it kept us aware of our teammates and classmates progress, so we could offer them help and encouragement. It also was very encouraging to be getting rewards for my class and my team's success. I also loved the football game and the scenery it provide us. The football game just made Math more fun.*

Another student said:

I liked the football game with our cooperative learning groups because it made me want to do homework. I was in a group with two other kids, and we were the Eagles. It was important not to let my team down by forgetting to get my work done on time. I even bribed a kid on my team to do his work, so we could get those points to move up on the football field. It worked. We were the leaders all of the way down the field. The football made it easy to see our progress and to show us if we were behind in our assignments. We would help each other if someone was behind. I really liked this because it was fun and educational. I even read the newspaper to learn as much as I could about the Eagles for trivia day. I liked the groups because it made learning fun.

In other classes students were frequently talking about math and how the groups were doing. During other classes like social studies, questions were consistently being asked about math.

"How many points do we have?"

"What are we doing in math today?"

"What's the trivia question going to be?"

"Can we have some free time to read the paper or look at the internet to look up our teams?"

Even right up to the end of the school year the students were asking questions about how many points their teams had, or if we could do football trivia questions even though we had stopped doing the cooperative learning groups at the end of third quarter.

Most of the students had positive comments about the cooperative learning groups, and they liked working in their teams except for one student who said, "*It was*

stupid, and I think I got dumber after working in these stupid groups." (This student dropped out of school soon after.)

Based on the participant observations and the interviews of the students, I believe the student's performance and their attitude towards math was greatly effected. Most of the students had positive comments about working in their cooperative learning groups. For the first time in the four years I have worked with students with E/BD I heard them talking positively about math and they talked positively about their own abilities to be successful at it.

The Super Bowl
Implications and Conclusions

The primary focus of the study was to determine if cooperative learning is effective in the math performance of students with E/BD in a self contained Federal Setting IV classroom. The study showed a positive impact on the Math performance of students with E/BD while they were participating in cooperative learning groups during math class. The biggest increase was on the homework completion rates of the students, which increased significantly. The students grades also increased significantly while participating in cooperative learning and the results from the Minnesota Basic Standards Test in Mathematics, showed a slight increase in the student's test scores from the previous years test or tests that had been taken. These increases in homework completion rates, math grades, and MBST test results show that there was an immediate positive result to the students from participating in cooperative learning.

The study also showed that cooperative learning had a positive impact on the unacceptable, negative behaviors that students with E/BD sometimes display at school. There seemed to be a greater effect on the behavior of these students than there was on their actual Math performance. There has been very little research on the effects of cooperative learning on the behaviors of students with E/BD. Most of the studies have focused on the student's performance in Math class, Calhoon (2003), and not the behavioral benefits of cooperative learning. These behavioral benefits of cooperative learning have received far less attention than have the positive effects on the student's achievement (Jenkins & O'Connor, 2003). This study, however, showed a large

improvement in the positive behaviors displayed at school and showed a large decrease in the serious disruptive behaviors that resulted in suspensions.

The students really enjoyed working in the cooperative learning groups. One student said, "I think that when we explain something we tend to listen more because it is more like we are just hanging out and chatting and not being talked at."

This could be an important aspect of cooperative learning and why it works in educational settings. Students seem to explain things better or explain them in their own language that makes it easier to understand. I was trying to teach the students simple algebra and the order of operations and they could not get the order correct. I went over it for a couple of days and kept repeating myself. "Parentheses, exponents, multiplication, division, addition and subtraction." Over and over again, I kept repeating it and the students could not grasp the order. Finally one student said, "Mick, I learned the order like this. Public Enemy means Dre always sings." Eventually the kids were repeating this acrostic poem over and over and they started getting it. It took each other to help understand a concept I could not get them to learn. I believe this is one reason cooperative learning is so successful. The students have an opportunity to talk to each other in their language and kids tend to listen better to each other than listening to adults.

The most intriguing aspect of my research was the fact that cooperative learning had such a positive aspect on the overall behaviors of the students. I believe that this was caused by the fact that cooperative learning taught the student's to work together for a common goal even though they did not particularly like each other. They realized that if they did not get along and work well together in their group they would not succeed as a team. They had to learn to put aside all personal differences that they may have and truly work together. By working together and learning to get along they built relationships

with each other and those relationships carried over into the rest of the school day and into the rest of their classes.

Cooperative learning holds an incredible amount of promise as an instructional model for students with E/BD in their Mathematics classrooms. Not only can cooperative learning improve the student's grades, their homework completion rates, and their performance on state tests, but the use of cooperative learning in the classroom can show a significant increase in the positive behaviors displayed by students with E/BD in the classroom and in the school building throughout the entire day. This is consistent with the findings by Jenkins, et al. (2003) on the positive effects of cooperative learning of special education students who participate in cooperative learning in all-inclusive settings taught by general education teachers. The long term effects of cooperative learning in Mathematics needs to be researched further which is also shown in the Sutherland, et al. (2000) study where they said that the academic achievement on students with E/BD remains uncertain.

I feel that a great deal more research needs to be devoted to the effects of cooperative learning on students with E/BD. Studies need to be conducted in both inclusive and self-contained classrooms to determine its true effectiveness. I also would be interested in other aspects of cooperative learning and its effects on student's learning and behavior. There are so many options in running cooperative learning in the classroom, one being the game of football I used. Such a study could clarify how much of the effects were from cooperative learning and how much the game had to do with the success. More research on the effects of intrinsic versus extrinsic rewards would also be an area of study. The question of, are rewards needed at all, came up for me. Students

appeared more intrinsically motivated by the activity and less by the extra rewards they were given.

There are still many questions that need to be answered concerning cooperative learning and students with E/BD but I am a strong believer in the positive effects of cooperative learning after conducting this study in my self-contained E/BD mathematics classroom.

Off Season
Self-Reflection

This study has taught me a lot about the effects of cooperative learning and how it impacts and benefits the lives and the studies of students with Emotional Behavior Disorders. I went into the study with the hopes that I would find a better away to teach math to these students and find a way to help them pass the MBST in mathematics. Many of these students struggle with these tests, and sometimes they never pass them unless they have the passing scores lowered in their IEP's. I wanted to find a way to better teach them Math, so they can still pass the test, but also learn the material so that they may be better prepared to transition back to mainstream classes and/or to be able to function better in the real world.

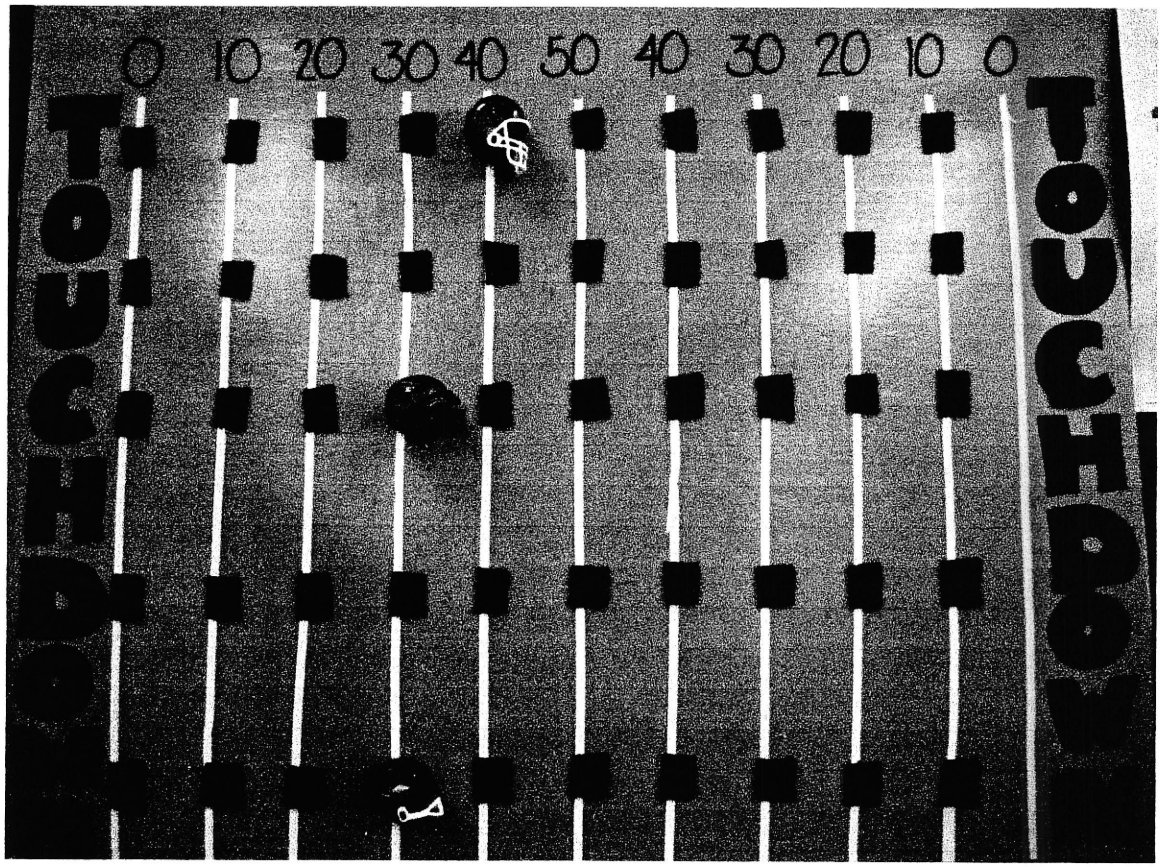
The results of the study proved to me that cooperative learning could be a very positive learning style used with children with E/BD in not only math classes but, in all subjects. The results showed positive increases in their academics. But the most surprising thing to me was the positive impact that cooperative learning seemed to have on their behavior and their social skills. The class seemed to work so much better and got along so much better while we were using the cooperative learning groups during second quarter.

The other thing that I noticed, and that gave me great satisfaction during this study, was that some of the students carried the skills they learned while participating in their groups over into third quarter. Even though they were not working in their groups anymore, students would volunteer to go help other students who would ask me or an

assistant for help. If a student needed help with their math, even while in ISS, another student would often volunteer to go see if they could help them. Even if the student was someone they did not particularly like, they would still offer them assistance. It was very gratifying to see the social impact that the cooperative learning groups had on this group of students.

Incorporating cooperative learning into my classroom took a little bit of extra work and time to track the students' scores and incorporate those scores into the football game, but it was well worth it. It had such a positive effect on my classroom, and it made such a difference in comparison with the other group, that I will use cooperative learning in my E/BD classroom in Math class and what ever subjects I may teach in the future. Although it took extra time and preparation, I feel that it made my job easier because of the effect on the student's behaviors that the cooperative learning groups had.

The Playbook
Appendices



Appendix A

Point Totals

Team Name: _____

Team Members: _____

Date	Imp. Pts.	Hmwk. Pts.	Test Pts.	Trivia Pts.	**Totals**

Improvement Points:
10% or more = 3 points
5-9% = 2 points
1-4% = 1 point

Tests:
100% = 3 points
95-99% = 2 points
90-94% = 1 point

Homework points either 5 or 0
Trivia points either a 5 or 0

Appendix B

Improvememt Points

TEAM_____

Team Members_____

NAME:	Base	Ass. #1 Date:	IP	Ass. #2 Date:	IP	Quiz	Base	Ass. #1 Date:	IP	Ass. #2 Date:	IP	Quiz

NAME:	Base	Ass. #1 Date:	IP	Ass. #2 Date:	IP	Quiz	Base	Ass. #1 Date:	IP	Ass. #2 Date:	IP	Quiz

NAME:	Base	Ass. #1 Date:	IP	Ass. #2 Date:	IP	Quiz	Base	Ass. #1 Date:	IP	Ass. #2 Date:	IP	Quiz

Appendix B

Interview Questions

1. How did you think these groups affected or impacted your performance on the MBST math test?

2. Explain your thoughts on working in groups and how it made you feel while you were working in them?

3. How did you like working in your cooperative learning groups and why do you feel that way?

4. Would you like to work in cooperative learning groups again in the future? Why?

Appendix C

Scouting Report
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